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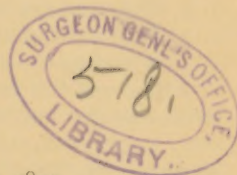


## ASEPSIS IN MINOR PROCEDURES.

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THE progress of the science of bacteriology has been retarded quite as much by the zealousness of well-meaning but ignorant supporters, as by the attacks of its bitterest and most scientific foes, and the same may be said for the doctrine of asepsis. I am quite convinced that no surgeon should lay upon his fellows "burdens grievous to be borne" unless he can guarantee some practical results to repay them for their trouble. But when it has been proved, for instance, that a single stitch which has been used in closing a wound without having been properly sterilized has caused the death of the patient, we must all agree that there is no such thing as a trivial detail in the carrying out of an aseptic technique.

I propose, therefore, to-day to speak of the principles of asepsis as applied to certain minor procedures.

In the clinical thermometer and the hypodermic syringe we have two very useful instruments if they are properly employed. I question whether it was ever our habit to put into the mouth of a patient a thermometer that had not been first cleaned, but all of us, I am sure, have taken our hypodermic syringe from its case, dissolved a tablet in water,

filled the syringe and plunged it without hesitation into the subcutaneous tissue. Of course our needle was apparently clean, but was it always surgically clean? One cannot deny that thousands of such punctures have been made without any bad results, but in our profession and with our present knowledge we are justified in allowing the patient to incur no risk which can be avoided by any foresight or trouble on our part.

In every work on surgery a certain amount of space is devoted to remarks on the subject of hypodermic injections. We are told what site should be chosen, and what possible dangers are to be avoided. Such suggestions are generally carefully noted and acted upon; but while much stress has been laid upon the dangers of puncturing a vein, or injuring the periosteum, and the like, the risk of setting up an infectious process, if the puncture be not made aseptically, has not by many authors been thought worthy of mention. That the danger of sepsis is by no means hypothetical is evidenced by the large number of cases of hypodermic punctures which have been followed by abscess



formation of localized phlegmons, and we have only to refer to the recent monograph of Fraenkel, of Hamburg, on "Gas Phlegmons," in which he reports two cases of fatal, spreading gangrene following such punctures, to further illustrate the danger which lurks beneath this ordinarily simple operation. Cases are on record in which erysipelas, malignant pustule and tuberculosis have actually been transmitted through the medium of the hypodermic syringe. The sources of infection to be particularly remembered are as follows:

1. The fluids to be injected.
2. The syringe and its needle.
3. The skin of the patient.
4. The hands of the operator.

Although the dangers of an infection from the two last named sources are not very great, yet, unless the case is very urgent, the careful surgeon will take time to disinfect both his own hands and the skin of his patient before introducing a hypodermic needle. Fortunately solutions of drugs, such as quinine, antipyrine, apomorphine, sometimes used for hypodermic injections, possess a certain amount of antiseptic power which tends to prevent the development and multiplication of pyogenic bacteria in them. On the other hand, solutions of the drugs in most common use, such as atropine, morphine, cocaine, and ergotine, favor the development of bacteria, and when kept too long or if made without proper precautions, are frequently found to be swarming with micro-organisms, with the result that not only are their medicinal properties sometimes impaired, but thousands of bacteria may be placed in the subcutaneous tissues. Though the greater number of these organisms may be harmless, occasionally pyogenic bacteria will be present which may give rise to the formation of local abscesses which are likely to prove very troublesome and even dangerous to life.

Fluids used for hypodermic injections must be sterile, and it would be better to make up a fresh solution each time. In private practice where the tablets are so much used, a very simple expedient enables us to make a practically sterile

solution in a few minutes. A dessert-spoonful of water is held over a lamp until the water boils. The tablet being then allowed to roll from its phial into the spoon is immediately dissolved and we have a practically sterile solution. Of course where the drug is one which is injured by a temperature of 100° C. the best we can do is to have the water boiled and allowed to cool somewhat before the tablet is placed in it. Where solutions must be kept for some days if they have been prepared aseptically, the addition of from two to three drops of pure carbolic acid for every 30 c. c. (one ounce) of the solution will prevent the development of bacteria and will not be sufficient to do any injury. Cocaine may be dissolved in various menstrua, but keeps best in a 1 to 10,000 solution of corrosive sublimate.

The sterilization of hypodermic syringes has been and is still a difficult problem. The complexity of the instrument, and especially the inaccessibility of the piston, renders it by no means an easy task to free it from germs. The ingenious syringe of Koch has no piston and is easily sterilized, but it is too inconvenient for practical use, and the many improvements have as yet failed to give us a satisfactory instrument. Before using the ordinary syringe the piston should be withdrawn from the barrel and both placed in a 5 per cent. solution of carbolic acid for ten minutes, which will render them sterile. Sterile water is afterwards drawn through the syringe to get rid of the carbolic acid. Hypodermic needles made of platinum can be rendered perfectly sterile by heating them in the flame of a Bunsen burner or of an alcohol lamp, but exposure of the ordinary needles to the flame soon ruins them.

Exploratory punctures and paracentesis are not so frequently resorted to as in former days, since major operations have been so much simplified, but it is still occasionally necessary to draw off the fluid from the abdomen in ascites or other conditions either for purposes of diagnosis or for the relief of the patient. The needle, trocar, or rubber tubes used should be sterilized by being boiled in a 1

per cent. soda solution, and the skin of the patient, as well as the hands of the operator, should be rendered clean.

All of us have too often seen cases of cystitis in the male caused by the introduction of a dirty catheter into the bladder. The rubber or metallic catheters may be easily rendered sterile by being boiled for five minutes in a 1 per cent. soda solution. The best we can do with the gum-elastic catheters is to soak them in a 1 to 1000 bichloride solution for at least an hour, and wash them off in hot sterile water just before using them. Catheterization of the female bladder is a simple procedure, but when done improperly has often been responsible for a setting up of a serious cystitis or even a fatal suppuration in the kidney or their pelves. The normal urine is probably always sterile, bacteria being discharged through the kidney only when there are lesions in the renal parenchyma. In the majority of cases of infection of the urinary passages the pathogenic bacteria have gained entrance from below. It is interesting to note that one of the most frequent organisms which is found accompanying cystitis, pyelitis and pyelonephritis, is a bacterium which cannot by our laboratory methods be distinguished from the *bacillus coli communis*. The *staphylococcus pyogenes aureus*, *streptococcus pyogenes* and *proteus vulgaris* are also sometimes found in cases of cystitis.

These facts should teach us the importance of thoroughly cleansing the external parts before we undertake the catheterization of the bladder. The patient should be in the dorsal position with the knees somewhat separated, the sheet being thrown over them, leaving the vulva exposed. We were formerly taught that a physician who was unable to catheterize a patient without exposure was unworthy to continue the practice of medicine. This maxim with our knowledge at that time was true enough, since a knowledge of anatomy and an educated touch are always of the greatest importance. But bacteriology has taught us that "catheterization in the dark" is no longer justifiable. The

labia ought to be held apart with a gauze sponge and the meatus urinarius and the parts around it are to be thoroughly cleansed with sponges of cotton and warm boric acid solution before the catheter is inserted. One great difficulty in the way of aseptic catheterization of the male has lain in the impossibility of sterilizing the gum-elastic catheters which are still often used, without at the same time injuring them. Fortunately in the female this difficulty has been obviated by the introduction of the glass catheter, which is easily rendered sterile by being cleansed with soap and warm water and then soaked in a 1 to 500 aqueous solution of bichloride of mercury. If by chance a glass catheter is not available one of rubber or silver may be employed after having been sterilized by being boiled in the 1 per cent. soda solution for five minutes. For a lubricant sterilized oil or, better, glycerin, may be used. With the glass catheter no lubricant is necessary.

It has been suggested that the urethra should be washed out carefully with some sterile fluid, inasmuch as this takes away a certain number of bacteria, but in the case of the female it has been shown that the chances of contamination from the urethra in the absence of a definite urethritis are very slight. After being used, the catheter should be scrubbed with brush and soap, and hot water or soda solution should be syringed through it until the lumen is thoroughly clean. It should always be kept in a 1 to 500 solution of corrosive sublimate or a 5 per cent. carbolic acid solution until it is needed again.

Irrigation of the bladder is often indicated, and for this purpose sterilized solutions of boric acid with or without glycerine or normal salt solution are generally used. The warm solution is filtered into a sterilized rubber bag or fountain syringe, the end of the conduit tube from the bag being attached to the sterilized glass catheter. After the urine has been drawn off, the solution is allowed to run slowly into the bladder, the stream being controlled by a pinch-cock placed on the tube. After about a pint has run in, or sooner if the patient



complains of pain, the tube is disconnected from the end of the catheter and the bladder allowed to empty itself. The process may be repeated two or three times until the washings are clear.

The observance of such precautions will, I am sure, minimize the number of the so-called accidents which still too

frequently occur. Without these measures ninety-nine cases out of a hundred may do perfectly well, but it is our bounden duty to use every endeavor to attain to certainty and to eliminate from medicine, wherever we can, the element of guess-work which is still the bane of our profession.



